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10/673,631	09/30/2003	Yong Suk Hwang	8736.047.00-US	1130

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EXAMINER	
LEE, SIU M	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/673,631	HWANG, YONG SUK	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8-11 and 14-22* is/are rejected.

7)☒ Claim(s) *5-7, 12-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

(1) Paragraph 0004, line 3, change "antenna 10" to ---antenna 101---. The reference number needs to be changed to reflect the correct reference characters for the pertinent figures. In figure 1, the label for the antenna is 101.

(2) Paragraph 0042, line 2, change "FIG 3A" to ---FIG 3(a)---.

(3) Paragraph 0043, line 4, change both "FIG 3B" to ---FIG 3(a)---.

(4) Paragraph 0044, line 3, change "FIG 4A" to ---FIG 4(a)--- and change "FIG 4B" to ---FIG 4(b)---.

(5) Paragraph 0055, line 1, change "FIG 4B" to ---FIG 4(b)---.

(6) Please define VSB where first mentioned in the specification as you have done with OQAM (offset quadrature amplitude modulation).

Appropriate correction is required.

Drawings

2. The drawings are objected to because in figure 5, block 504 should be labeled as ---Second signal converter--- instead of "First signal converter".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claims 1-6, 8-17-25 are objected to because of the following informalities:

(1) Please define OQAM, VSB, and DC when first mentioned in the claims.

(2) Claim 1, line 8, the examiner suggests to change "an oscillator for generating **a** complex carrier" to ---an oscillator for generating **the** complex carrier--- because the complex carrier has been recited in line 2 of claim 1.

(3) Claim 8, line 8, the examiner suggests to change "an oscillator for generating **a** complex carrier" to ---an oscillator for generating **the** complex carrier--- because the complex carrier has been recited in line 2 of claim 8.

(4) Claim 14, line 11, the examiner suggests to change "an oscillator for generating **a** complex carrier" to ---an oscillator for generating **the** complex carrier--- because the complex carrier has been recited in line 2 of claim 14.

(5) Claim 19, line 10, the examiner suggests to change "an oscillator for generating **a** complex carrier" to ---an oscillator for generating **the** complex carrier--- because the complex carrier has been recited in line 2 of claim 19.

Appropriate correction is required.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-4, 8-11 and 14-22 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4,

9-12, 14 and 16-18 of copending Application No. 10/683,443. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims of the application are clearly encompassed by claims of the copending application. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

5. The subject matter claimed in the instant application is fully disclosed in the reference copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter as follows:

(1) Regarding claim 1:

The same digital television receiver is claimed in both applications (claim 1 of application 10/683,443). In the instant application, the word "estimating part" is used wherein in the application 10/683,443, the word "predictor" is used. Both word are considered performing the same function of estimating or predicting the carrier phase error.

(2) Regarding claim 2:

The same estimating part (or predictor) is claimed in both applications.

(3) Regarding claim 3:

The same calculation method used in the estimating part (or predictor) is claimed in both applications.

(4) Regarding claim 4:

The same calculation method used in the estimating part (or predictor) is claimed in both applications.

(5) Regarding claim 8:

The same method of recovering a carrier is claimed in both applications.

(6) Regarding claim 9 and 10:

The claimed subject matter is combined in claim 12 of the application 10/683443.

(7) Regarding claim 11:

The same claimed subject matter is claimed in both applications.

(8) Regarding claim 14:

The claimed subject matter is recited in the independent claim 1 and dependent claim 9 of the application 10/683443. Since claim 9 of the application 10/683443 is depending on claim 1, therefore all the limitations of claim 1 is contained in claim 9.

(9) Regarding claim 15:

The claimed subject matter is recited in the dependent claim 2 of the application 10/683443.

(10) Regarding claim 16:

The claimed subject matter is recited in the dependent claim 3 of the application 10/683443.

(11) Regarding claim 17:

The claimed subject matter is recited in the dependent claim 4 of the application 10/683443.

(12) Regarding claim 18:

The claimed subject matter is recited in the dependent claim 10 of the application 10/683443.

(13) Regarding claim 19:

The claimed subject matter is recited in the independent claim 9 and the independent claims 17 and 18 of the application 10/683443.

(14) Regarding claim 20:

The claimed subject matter is recited in the dependent claim 12 of the application 10/683443.

(15) Regarding claim 21:

The claimed subject matter is recited in the dependent claim 14 of the application 10/683443.

(16) Regarding claim 22:

The claimed subject matter is recited in the dependent claim 16 of the application 10/683443.

The chart below summarizes the double patenting issues.

Claim	Current application	Application 10/683443	Claim
1	A device for recovering a carrier comprising: a first signal converter for multiplying a complex carrier caused by a phase error to a digitized passband VSB signal, to	**An apparatus for recovering carrier, comprising: a first signal converter outputting a base band VSB signal by multiplying a pass band VSB signal and a complex number**	1

	provide a baseband VSB signal; a second signal converter for multiplying a complex value of a frequency to the signal from the first signal converter, to convert the baseband VSB signal into an OQAM signal; an error estimating part for generating a signal having carrier phase error information by using a real component and an imaginary component of the OQAM signal; and an oscillator for generating a complex carrier according to the carrier phase error information.	**carrier according to a phase error; a second signal converter converting the base band VSB signal to an OQAM complex signal by multiplying a complex number value of a predetermined frequency to the signal outputted from the first signal converter;** a lock detector detecting whether the carrier frequency is locked using the OQAM complex signal; **an error predictor predicting the carrier phase error using the real number component and the imaginary number component of the OQAM complex signal; and an oscillator generating complex carrier according to the carrier phase error.**	

2	The device as claimed in claim 1, wherein the error estimating part multiplies the real component and the imaginary component of the OQAM signal.	**The apparatus of claim 1, wherein the error predictor multiplies the real number component and the imaginary component.**	2
3	The device as claimed in claim 1, wherein the error estimating part respectively squares the real component and the imaginary component of the OQAM signal, and calculates a difference of a squared value of the real component and a squared value of the imaginary component.	**The apparatus of claim 1, wherein the error predictor squares the real number component and the imaginary component, and calculates difference between the square value of the real number component and the square value of the imaginary number component.**	3
4	The device as claimed in claim 1, wherein the error estimating part calculates absolute values of the real component and the imaginary component of the OQAM signal, and calculates a	**The apparatus of claim 1, wherein the error predictor calculates an absolute value of the real number component and the imaginary component, and calculates**	4

	difference of absolute values of the real component and the imaginary component.	**difference between the absolute value of the real number component and absolute value of the imaginary component.**	
8	A method for recovering a carrier comprising the steps of: (a) multiplying a digitized passband VSB signal to a complex carrier caused by a phase error to convert the passband VSB signal into a baseband VSB signal; (b) multiplying a complex value of a frequency to the baseband VSB signal, to convert the baseband VSB signal to an OQAM signal; (c) generating a signal including carrier phase error information by using a real component and an imaginary component of the OQAM signal; and (d)	**A method for recovering carrier, comprising the steps of: (a) converting a pass band VSB signal into a VSB signal by multiplying the pass band signal and complex carrier according to phase error of the carrier together; (b) converting base band VSB signal into OQAM complex signal by multiplying base band VSB signal by complex number value of a predetermined frequency; (c) estimating carrier phase error and detecting whether carrier frequency is locked using**	11

	generating a complex carrier according to the carrier phase error information.	**real number component and imaginary component of the OQAM signal; and (d) creating complex carrier according to the phase error of the carrier.**	
9 10	The method as claimed in claim 8, wherein the step (c) includes the step of multiplying the real component and the imaginary component of the OQAM signal. The method as claimed in claim 8, wherein the step (c) includes the step of respectively squaring the real component and the imaginary component of the OQAM signal, and calculating a difference of squares of the real component	**The method of claim 11, comprising the steps of: multiplying the real number component and the imaginary number component of the OQAM signal for estimating the carrier phase error**; and **calculating difference between the squared real number component and the squared imaginary number component of the OQAM signal for estimating whether the carrier frequency is locked.**	12

	and the imaginary component.		
11	The method as claimed in claim 8, wherein the step (c) includes the step of respectively calculating absolute values of the real component and the imaginary component of the OQAM signal, and calculating a difference of absolute values of the real component and the imaginary component.	**The method of claim 11, wherein each absolute value of the real number component and imaginary number component of the OQAM is calculated and difference between the absolute value of the real number component and the absolute value of the imaginary number component is calculated for estimating the carrier phase error.**	16
14	A device for recovering a carrier comprising: a first signal converter for multiplying a complex carrier caused by a phase error to a digitized passband VSB signal, to provide a baseband VSB	An apparatus for recovering carrier, comprising: **a first signal converter outputting a base band VSB signal by multiplying a pass band VSB signal and a complex number carrier according to a phase**	9 (Including the limitation of claim 1)

	signal; a second signal converter for multiplying a complex value of a frequency to the signal from the first signal converter, to convert the baseband VSB signal into an OQAM signal; an error estimating part for generating a signal having carrier phase error information by using a real component and an imaginary component of the OQAM signal; a sampling part for sampling a signal from the error estimating part to shift the signal to a DC position; a filter for filtering, and accumulating the signal from the sampling part; and an oscillator for generating a complex carrier according to a signal from the filter.	**error; a second signal converter converting the base band VSB signal to an OQAM complex signal by multiplying a complex number value of a predetermined frequency to the signal outputted from the first signal converter**; a lock detector detecting whether the carrier frequency is locked using the OQAM complex signal; **an error predictor predicting the carrier phase error using the real number component and the imaginary number component of the OQAM complex signal; and an oscillator generating complex carrier according to the carrier phase error.** The apparatus of claim 1,	

		wherein the lock detector comprises: a multiplier for multiplying the real number component and the imaginary component of the OQAM signal; a filter for passing the high pass band of the signal outputted form the multiplier; **a decimator for sampling the frequency of the signal outputted from the filter down to transfer to the DC location; an accumulator for accumulating the signals outputted from the decimator; and a comparer for comparing the accumulated value outputted from the accumulator with the set value**, and judging the carrier frequency is locked if the accumulated value is larger than the set value.	

15	The device as claimed in claim 14, wherein the error estimating part is a multiplier for multiplying the real component and the imaginary component of the OQAM signal.	**The apparatus of claim 1, wherein the error predictor multiplies the real number component and the imaginary component.**	2
16	The device as claimed in claim 14, wherein the error estimating part includes; a squaring part for respectively squaring the real component and the imaginary component of the OQAM signal, and a subtractor for calculating a difference of a squared value of the real component and a squared value of the imaginary component.	**The apparatus of claim 1, wherein the error predictor squares the real number component and the imaginary component, and calculates difference between the square value of the real number component and the square value of the imaginary number component.**	3
17	The device as claimed in claim 14, wherein the error estimating part includes; an absolute value calculating part for calculating	**The apparatus of claim 1, wherein the error predictor calculates an absolute value of the real number**	4

	absolute values of the real component and the imaginary component of the OQAM signal, and a subtractor for calculating a difference of absolute values of the real component and the imaginary component.	**component and the imaginary component, and calculates difference between the absolute value of the real number component and absolute value of the imaginary component.**	
18	The device as claimed in claim 14, wherein the sampling part samples a frequency component of timing edges of a signal from the error estimating part.	**The apparatus of claim 1, further comprising: a filter for passing only the frequency by timing edge of the signal outputted from the phase error; and a decimator for transferring the frequency component outputted from the filter to the DC location.**	10
19	A method for recovering a carrier comprising the steps of: (a) multiplying a digitized passband VSB signal to a complex carrier caused by a	Claim 11: A method for recovering carrier, comprising the steps of: (a) **converting a pass band VSB signal into a VSB signal by**	11, 17, 18

	phase error to convert the passband VSB signal into a baseband VSB signal; (b) multiplying a complex value of a frequency to the baseband VSB signal, to convert the baseband VSB signal to an OQAM signal; (c) generating a signal including carrier phase error information by using a real component and an imaginary component of the OQAM signal; (d) sampling a frequency component only having the carrier phase error information and shifting to a DC position; and (e) generating a complex carrier according to the sampled frequency component.	**multiplying the pass band signal and complex carrier according to phase error of the carrier** together; (b) **converting base band VSB signal into OQAM complex signal by multiplying base band VSB signal by complex number value of a predetermined frequency**; (c) estimating carrier phase error and detecting whether carrier frequency is locked using real number component and imaginary component of the OQAM signal; and (d) **creating complex carrier according to the phase error of the carrier**. Claim 17: The method of claim 11, further comprising the steps of: filtering for passing only frequency	

		component by timing edge of the signal including estimated carrier phase error; and **sampling the frequency component**. Claim 18: The method of claim 11, further comprises a step of **transforming frequency component by timing edge of the signal including estimated carrier phase error to DC location.**	
20	The method as claimed in claim 19, wherein the step (c) includes the step of multiplying the real component and the imaginary component of the OQAM signal.	The method of claim 11, comprising the steps of: **multiplying the real number component and the imaginary number component of the OQAM signal** for estimating the carrier phase error; and calculating difference between the squared ream number	12

		component and the squared imaginary number component of the OQAM signal for estimating whether the carrier frequency is locked.	
21	The method as claimed in claim 19, wherein the step (c) includes the step of respectively squaring the real component and the imaginary component of the OQAM signal, and calculating a difference of squares of the real component and the imaginary component.	The method of claim 11, wherein **each of the real number component and the imaginary number component are squared, difference between the two squared values is calculated**, and the real number component and the imaginary number component of the OQAM signal are multiplied together for estimating whether the carrier frequency is locked.	14
22	The method as claimed in claim 19, wherein the step (c) includes the step of respectively calculating absolute values of	The method of claim 11, wherein **each absolute value of the real number component and imaginary**	16

	the real component and the imaginary component of the OQAM signal, and calculating a difference of absolute values of the real component and the imaginary component.	**number component of the OQAM is calculated and difference between the absolute value of the real number component and the absolute value of the imaginary number component is calculated** for estimating the carrier phase error.	

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wang (US 6,356,598 B1) discloses a demodulator for an HDTV receiver. Strolle et al. (US 5,872,815) discloses an apparatus for generating timing signals for a digital television signal receiver. Scarpa et al. (US 5,673,293) discloses a method and apparatus for demodulating QAM and VSB signals. Grabb et al. (US 6,539,062 B1) discloses a pilot signal control for digital television DTV transmission.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083.

The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M. Lee
12/13/2006

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER